

ABSTRACT

Apparatus and methods are provided for interacting light with particles, including but not limited to biological matter such as cells, in unique and highly useful ways. Optophoresis consists of subjecting particles to various optical forces, especially optical gradient forces, and more particularly moving optical gradient forces, so as to obtain useful results. In biology, this technology represents a practical approach to probing the inner workings of a living cell, preferably without any dyes, labels or other markers. In one aspect, a method is provided for separating particles by flowing the particles within a first constrained path, the first constrained path having an input and an output, and a sorting region, the sorting region coupling to a second constrained path, the second constrained path including an output, illuminating the sorting region with a moving optical gradient, characterized in that certain of the particles flow in a laminar manner between the first inlet and the output of the first constrained path, and selected particles are diverted from the first constrained path to the second constrained path under the force of the moving optical gradient.